



## **Air Quality Permitting Technical Memorandum**

**Tier II Operating Permit No. 001-00030**

**IBP Inc., Kuna, Idaho**

**Project No. T2-000700**

*Prepared by:*

**Carole Zundel, Permit Writer  
State Office of Technical Services  
May 10, 2002**

**FINAL PERMIT**

## LIST OF ACRONYMS

ACFM	Actual Cubic Feet Per Minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
CO	Carbon Monoxide
°F	Degrees Fahrenheit
DEQ	Department of Environmental Quality
grains/acf	Grains Per Actual Cubic Foot (1 lb = 7,000 grains)
grains/dscf	Grains Per Dry Standard Cubic Foot
IDAPA	A numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	Pounds Per Hour
lb/day	Pounds Per Day
MMBtu/hr	Million British Thermal Units per Hour
NAAQS	National Ambient Air Quality Standard
NO <sub>x</sub>	Nitrogen Oxides
O&M	Operations & Maintenance
OP	Operating Permit
PM <sub>10</sub>	Particulate Matter with an Aerodynamic Diameter of 10 Micrometers or Less
SO <sub>2</sub>	Sulfur Dioxide
T/yr	Tons Per Year
USDA	United States Department of Agriculture
VOC	Volatile Organic Compound

## **PURPOSE**

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01 Sections 404.04 (*Rules for the Control of Air Pollution in Idaho*) (*Rules*) for Tier II operating permits.

## **PROJECT DESCRIPTION**

This project is for the modification and renewal of a Tier II operating permit (OP) for IBP Inc., located in Kuna, Idaho. The emissions sources of the facility are listed in the discussion section in Table 1.1.

## **FACILITY DESCRIPTION**

IBP Inc.-Kuna, is a beef processing and rendering facility which processes about 225 head of cattle per hour. The cattle are butchered, cleaned, split in half, quickly chilled to about 31 degrees Fahrenheit (°F), and sent to Pasco, Washington, for further processing. The hides are removed and sent to Pacific Hides in Nampa. The contents of the stomach are removed and piped to a truck loadout. The rest of the animal parts are ground up and rendered. The rendered material is separated into liquid and solid products. The liquid, edible product is used for deep fat frying. The solid product is used for animal food. The blood is dried and used for animal food.

## **SUMMARY OF EVENTS**

February 2001	Department of Environmental Quality (DEQ) received an application, dated February 8, 2001, for a Tier II OP from IBP Inc.
April 11, 2001	DEQ received a letter with modifications to the application.
October 23, 2001	Application was declared complete.
December 19, 2001	DEQ sent the facility a draft copy of the permit and tech memo.
December 24, 2001	DEQ received a letter dated December 14, 2001, with revised emissions estimates and ambient air dispersion modeling.
January 8, 2002	DEQ received comments about the draft permit from the facility.
March 29 – April 29, 2002	A public comment period was held. No comments were received. No hearing was requested.

## **DISCUSSION**

### **1. Emission Estimates**

#### **1.1 Facility-wide**

Table 1.1 lists all sources of emissions that are regulated in this Tier II OP:

**Table 1.1 Emissions Sources**

Source Description	Emissions Control(s)
East and west boilers	None
Two generators and one fire pump	None
Hide up-puller	Cyclone scrubber
Inedible/blood system, including: Cookers 1-5 Prepress Expellers 1-4 (vents) Inedible Centrifuge 4 tallow tanks Blood feed screw vent Milling screw conveyors (2 points) Grease centrifuge Raw blood tank Crax bin* Lo pro transfer to storage bin* Crax hammermill* Crax rotex screen* Crax milling screw vent Blood centrifuge Blood dryer (emissions from blood) Blood dryer (emissions from natural gas combustion) Edible centrifuge*	Spray tower(knockout)/ venturi/packed-bed scrubber
Meat and bone meal silo and airlocks	Meat and bone meal baghouse
Blood silo	Blood silo baghouse
Blood silo airlocks	Blood silo airlock baghouse (new in summer 2001)

\*These sources are open to room air. It is estimated that 60% of the emissions are controlled by the enclosure of the building. The remaining emissions are captured by room fans and sent to the packed bed scrubber.

In the initial Tier II OP, dated February 26, 1996, emissions were limited for all identified sources of air pollution. For the current renewal, some emissions limits were eliminated because the sources were considered to be insignificant per a February 22, 2001, phone conversation between Mary Anderson of the DEQ and Elizabeth Carper of Trinity Consultants (the facility's consultant). This phone conversation is referenced in the June 2001, "Tier II Operating Permit Renewal Application Ambient Air Dispersion Modeling Addendum." The following sources are the air pollution emitting sources at the facility that do not require specific permit conditions to demonstrate compliance with applicable air quality standards. These sources produce minimal emissions according to the referenced telephone conversation:

- Natural gas space heaters rated at less than or equal to 5 MMBtu/hr. The total facility capacity is less than 30 MMBtu/hr.
- Propane space heaters rated at less than or equal to 5 MMBtu/hr.
- Onsite gas and fuel oil tanks.
- Aerosol can puncturing system.
- Carcass acid wash.
- Leg wash.
- Fugitive emissions from loadouts.

Therefore, because these sources have minimal emissions, the natural gas space heater and fuel oil tank requirements in the previous permit were removed. General facility-wide requirements apply to all above-referenced sources, but these sources are not specifically regulated in the permit. Estimated potentials to emit are listed in the permit in the appendix. The following additional sources were also determined to produce minimal emissions:

- Lo pro unloading.
- Blood hammermill.
- Pasteurization cabinet.

In the permit application, the blood hammermill was incorrectly identified as having a cyclone because the information was copied from a different application. For the Kuna facility, there are no emissions from the blood hammermill, as it is totally enclosed. This is documented in a November 15, 2001, e-mail from Rechelle Holloway of IBP to Carole Zundel of DEQ.

No grain-loading standard monitoring is required for the sources not specifically regulated by this permit because it is not expected that these sources will exceed the standard. This expectation is based on calculations done for similar types of natural gas burning equipment for other facilities. Calculations for similar types of equipment have shown grain-loading rates that were well below the standard.

## 1.2 East and West Boilers

The east and west boilers do not have a natural gas meter, so the facility cannot track natural gas usage for each boiler individually. Using a calculated emission rate, the emission limits on the boilers will not be exceeded if they are operated 8,760 hours entirely on natural gas. No other emission limits are based on natural gas usage. Therefore, there is no need to track natural gas usage. Thus, the natural gas usage tracking required by the previous permit was removed.

The hours of operation for the boilers were not limited because as long as the fuel oil usage limit is not exceeded, the calculated allowable emissions will not be exceeded.

The emissions were estimated based on the worst-case scenario for maximum emissions for each pollutant. Based on the permitted amount of 1.3 million gallons of fuel oil per year and unlimited natural gas usage, emissions were estimated for all pollutants based on all fuel oil being used at the maximum firing rate, then natural gas used for the remainder of the year. Then all pollutants were estimated using natural gas at the maximum rate for 8,760 hours per year. The highest hourly rate was selected from these scenarios (No. 2 fuel oil for PM<sub>10</sub>, NO<sub>x</sub>, and SO<sub>2</sub>, and natural gas for CO and VOC). Then the maximum annual emissions were calculated by using fuel oil for 7,222 hours (at maximum capacity until all allowed fuel oil is used, then natural gas for the remainder of the year) for PM<sub>10</sub>, NO<sub>x</sub>, and SO<sub>2</sub>, and natural gas for 8,760 hours for CO and VOC. These values were used as permit emission limits. This approach changed some of the emission limits from the previous permit, as referenced in Table 1.2

PM<sub>10</sub>, SO<sub>2</sub>, and NO<sub>x</sub> emissions are limited in the permit. Carbon monoxide and VOC emissions are not limited in the permit because DEQ determined that these emissions are inherently limited by the fuel usage.

- Lo pro unloading.
- Blood hammermill.
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No grain-loading standard monitoring is required for the sources not specifically regulated by this permit because it is not expected that these sources will exceed the standard. This expectation is based on calculations done for similar types of natural gas burning equipment for other facilities. Calculations for similar types of equipment have shown grain-loading rates that were well below the standard.

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The hours of operation for the boilers were not limited because as long as the fuel oil usage limit is not exceeded, the calculated allowable emissions will not be exceeded.

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PM<sub>10</sub>, SO<sub>2</sub>, and NO<sub>x</sub> emissions are limited in the permit. Carbon monoxide and VOC emissions are not limited in the permit because DEQ determined that these emissions are inherently limited by the fuel usage.

**Table 1.2 Pollutant Emissions**

Pollutant	Previous Limit (lb/hr)	Revised Emission Estimate (lb/hr)	Previous Limit (t/yr)	Revised Emission Estimate (t/yr)
PM <sub>10</sub> <sup>3</sup>	0.329	0.6	1.440	2.29
SO <sub>2</sub> <sup>4</sup>	12.960	12.8	46.800	46.16
CO <sup>5</sup>	0.900	2.1	3.679	9.09
NO <sub>x</sub> <sup>6</sup>	3.600	3.6	14.717	14.9
VOC <sup>7</sup>	0.067	0.14	0.293	0.60

- 1 Pounds per hour
- 2 Tons per year
- 3 Particulate Matter with an Aerodynamic Diameter of 10 Micrometers or Less
- 4 Sulfur Dioxide
- 5 Carbon Monoxide
- 6 Nitrogen Oxides
- 7 Volatile Organic Compound

Fuel oil sulfur content is limited by rule and is required to be tracked on each delivery of fuel by maintaining the purchase records from the manufacturer which present the sulfur content.

The grain-loading limit will not require monitoring when natural gas is used because at the maximum rate of operation, the calculated PM does not exceed the limit, as follows:

$$\frac{0.03 \text{ lb PM}}{1 \text{ Hour}} \times \frac{1}{11,500 \text{ ACFM}} \times \frac{1 \text{ Hour}}{60 \text{ Min.}} \times \frac{7,000 \text{ grains}}{1 \text{ lb.}} = 0.0003 \text{ grains/acf}$$

This is compared to the limit of 0.015 grains/dscf. The conversion from actual to dry standard cubic feet is unlikely to result in a difference that would result in the standard being exceeded.

The grain-loading limit will not require monitoring when fuel oil is used because at the maximum rate of operation, the calculated PM does not exceed the limit, as follows:

$$\frac{0.6 \text{ lb PM}}{1 \text{ Hour}} \times \frac{1}{11,500 \text{ ACFM}} \times \frac{1 \text{ Hour}}{60 \text{ Min.}} \times \frac{7,000 \text{ grains}}{1 \text{ lb.}} = 0.006 \text{ grains/acf}$$

This is compared to the limit of 0.050 grains/dscf. The conversion from actual to dry standard cubic feet is unlikely to result in a difference that would result in the standard being exceeded.

### 1.3 Two Generators and Fire Pump

The emissions limits were updated to reflect the current emissions estimates and modeling. The previous permit had limits that were about 22% higher than the current permit.

PM<sub>10</sub>, SO<sub>2</sub>, and NO<sub>x</sub> emissions are limited in the permit. Carbon monoxide and VOC emissions are not limited in the permit because DEQ determined that these emissions are inherently limited by the fuel usage.

**Table 1.3 Emissions Limits**

Pollutant	Previous Limit (lb/hr) <sup>1</sup>	Revised Emission Estimate (lb/hr)	Previous Limit (T/yr)	Revised Emission Estimate (T/yr)
PM <sub>10</sub> <sup>3</sup>	0.702	0.576	0.175	0.144
SO <sub>2</sub> <sup>4</sup>	0.656	0.536	0.164	0.134
CO <sup>5</sup>	2.150	1.744	0.538	0.436
NO <sub>x</sub> <sup>6</sup>	9.981	8.1	2.495	2.025
VOC <sup>7</sup>	0.815	0.66	0.204	0.165

- 1 Pounds per hour  
2 Tons per year  
3 Particulate Matter with an Aerodynamic Diameter of 10 Micrometers or Less  
4 Sulfur Dioxide  
5 Carbon Monoxide  
6 Nitrogen Oxides  
7 Volatile Organic Compound

The permit application shows a representative calculation of the emissions. The maximum rated capacity of the equipment was used to calculate the emissions, showing that the equipment cannot exceed the calculated hourly emissions. If the hours of operation are not exceeded, the calculated emission from the equipment cannot exceed the annual emissions limits. Therefore, no monitoring and recordkeeping were required for the emissions.

Monitoring and recordkeeping are required for hours of operation, because the annual emissions of each pollutant were based on a limit of 500 hours of operation. Fuel oil sulfur content is limited by rule and is required to be tracked on each delivery of fuel by maintaining the purchase records from the manufacturer which present the sulfur content.

The grain-loading limit will not require monitoring when fuel oil is used because at the maximum rate of operation, the calculated PM is unlikely to exceed the limit based on calculations for similar equipment. The exit airflow rate for the generators is not shown in the permit application, so an exact calculation cannot be done.

#### 1.4 Hide Up-Puller and Cyclone Scrubber

In the previous permit, the hide up-puller was incorrectly identified as a hide down-puller, so this name was changed in the revised permit. These are two different processes, with the down-puller having minimal emissions and the up-puller having some emissions, which are controlled by a cyclone scrubber.

Compliance with the emissions limits can be determined by calculation using an emission factor from a stack test by TRC Environmental Corp. This calculation was documented in a November 28, 1988, letter from Bruce George, Pollution Control Specialist at IBP, to Orville Green, Bureau of Air Quality Division of Environmental Quality, regarding construction of a hide puller scrubber system. The calculation in the permit application was based on:

- 390 head per hour processed (the USDA limit).
- Average weight of 752 pounds per head.
- Emission factor of  $8.26 \times 10^{-4}$  pounds PM<sub>10</sub> per ton beef processed.
- Permit limit of 2,800 hours per year of operation (for annual standard).



This table shows the previous permit limits for this process and the revised limits which are written for the new permit:

**Table 1.4 Pollutant Limits**

Pollutant	Previous Limit (lb/day)	Revised Limit (lb/day)	Previous Limit (lb/hr)	Revised Limit (lb/hr)
PM <sub>10</sub>	1	0.12 PM <sub>10</sub>	1.4	0.170 PM <sub>10</sub>

The hours of operation are limited to 2,800 per year as that is what is shown in the previous permit and in the application. Hours are required to be tracked daily, when operating. Compliance with this requirement will automatically show compliance with the annual emissions limit because the emissions were calculated based on a source test and the maximum rate of operation.

The equipment to monitor the pressure differential and scrubant flow rate of the scrubber is required to be operated and maintained in accordance with manufacturer specifications. Pressure differential and scrubant flow rate are required to be monitored and recorded daily and are limited to the manufacturer specifications.

The existing operations and maintenance (O&M) manual for the system is required to be updated within 60 days of the issuance of the permit.

Odor complaints are required to be tracked and reported to DEQ within 15 days, along with any corrective action planned or taken.

#### 1.5 Inedible/Blood System

In the previous permit, the blood dryer and cookers were limited separately. Fugitive emissions from the process rooms and miscellaneous other sources, shown in Table 1.1, were not specifically regulated. With the new design, the blood dryer, the cookers, and many of the other sources are ducted to the redesigned scrubber system. The system originally consisted of a venturi scrubber and a packed tower. With the new design, the venturi scrubber and the packed tower were redesigned and a spray tower was added to the system. The spray tower, also called a knockout tower, processes the emission streams from the sources listed in the inedible/blood system section of Table 1.1 before they enter the venturi scrubber, except for the air from the process rooms, which is ducted directly to the packed tower.

The redesign causes many previously unregulated-by-permit fugitive emissions sources to become part of the scrubber emissions stream, so the emission and control efficiency calculations were applied to all of those sources, resulting in a single emission point from the packed tower for regulation.

The emissions limits in the permit were determined by adding the estimated controlled emissions from all contributing sources. For compliance purposes, two product streams can be monitored which are proportional to all other processes that have emissions processed by the scrubber system. The two product streams are finished blood (blood that has most of the moisture removed) and meat and bone meal. Limiting these two product streams automatically limits all the parts of the process with emissions that are controlled by the scrubber system.

The previous permit limited the process rate hourly. There were no monitoring requirements for this process rate limit. The facility does not track the production rate on an hourly basis, but on a daily basis, with the daily results compiled monthly. The emission estimates were based on the maximum equipment rating and the maximum hours of operation (8,760 hours per year). The lo pro transfer to storage bin emission estimate was based on a maximum process rate only and not on hours of operation, which was not applicable in this estimate. The emissions calculations and process descriptions are detailed in the April 5, 2001, letter from IBP Inc. to Tom Krinke of the Boise Regional Office. The letter contains modifications to the February 8, 2001, Tier II permit application.

The emissions limits have been changed from the previous permit due to the redesign of the scrubber system, which now includes many previously-fugitive emissions as well as the previously-regulated sources. The previous limits presented in Table 1.5 are the sum of the permit emissions limits of the blood dryer and the cookers. These emissions have now been combined into a single emission limit because emissions from those processes go through a single scrubber system and are emitted from that scrubber system's stack.

PM<sub>10</sub>, SO<sub>2</sub>, and NO<sub>x</sub> emissions are limited in the permit. Carbon monoxide and VOC emissions are not limited in the permit because DEQ determined that these emissions are inherently limited by the fuel usage.

**Table 1.5 Pollutant Limits**

<b>Pollutant</b>	<b>Previous Limit (lb/hr)</b>	<b>Revised Emission Estimate (lb/day)</b>	<b>Previous Limit (T/yr)</b>	<b>Revised Emission Estimate (T/yr)</b>
PM <sub>10</sub>	10.556 (PM)	16.4	46.235 (PM)	3.00
SO <sub>2</sub>	0.002	0.62	0.007	0.12
CO	0.053	5.40	0.230	1.00
NO <sub>x</sub>	0.250	6.41	1.095	1.17
VOC	0.010	16.3	0.042	2.98

Some of the processes have uncontrolled emissions inside one of three rooms. The room air, which includes these emissions, is ducted to the packed tower scrubber. Emissions from the sources in the room are calculated based on a control efficiency for the building of 60% (EPA-450/3-88-008 September 1988, "Control of Open Fugitive Dust Sources") and the tested 95% efficiency for PM rating for the packed tower scrubber.

The hourly emissions limits were eliminated and daily limits were imposed instead because production is tracked on a daily basis, not on an hourly basis, and all processes were estimated and modeled at the maximum potential to emit (including controls). Therefore, daily tracking can be used to demonstrate compliance with the PM<sub>10</sub> 24-hour NAAQS standard. Compliance with the other pollutant standards that have less than 24-hour NAAQS standards can be inferred from a daily record, as the calculated values cannot be exceeded even at the maximum rate of operation. Therefore, hourly limits and the associated hourly tracking are not necessary to demonstrate compliance. Daily limits and tracking are adequate.

The permit requires monthly compilation of daily production records. Because of the methods used to track the information, some data processing is required in order to show total tons per day produced. The raw data is not processed each day. Each day's data is accumulated, then processed once a month. The resulting data shows the total tons produced on each individual day.

Because the emissions were estimated at the maximum production rate, it is unlikely that the daily production limits would be exceeded, so real-time daily compilation of the production records has been determined to be unnecessarily burdensome.

Although not detailed in the permit application, according to a phone call between Rechelle Hollowaty of IBP Inc. and Carole Zundel of DEQ on November 21, 2001, the edible centrifuge emissions are inside one of the buildings and are ducted to the packed tower scrubber. The edible centrifuge emissions are included in the inedible/blood system emissions.

#### 1.6 Control Equipment

As shown in the application and as listed in Table 1.1, most processes are vented to a spray tower, then to a venturi scrubber, then to a packed tower. The venturi scrubber and the packed tower were manufactured by Premier, but have since been redesigned and have different operating parameters. The modified operating parameters are specified in the application, and will be included in the facility's O&M manual.

The spray tower, the venturi, and the packed tower specific operating parameters were removed since the previous permit and compliance with O&M manual specifications were required instead. For the packed tower, requirements to monitor pH and chlorine residual in the form of oxidation reduction potential (ORP) were added.

#### 1.7 Meat and Bone Meal Silo and Airlocks

As with the inedible/blood system tracking, the production rates and compliance with the limits are based on daily values.

The PM<sub>10</sub> emissions from the meat and bone meal throughput into the silo and through the airlocks are controlled by the meat and bone meal baghouse. The current baghouse has a PM<sub>10</sub> control efficiency of 99%.

The annual throughput for the silo and airlocks is limited by the process and by the permit to 70,080 tons per year. The daily rate for throughput into the silo is 192 tons per day. The daily loadout rate can be higher than the input into the silo, although the annual total is the same. The daily loadout rate is limited to 292 tons per day. This is the value used when calculating the airlock daily PM<sub>10</sub> emission rate. The limit for the baghouse is the total of the emissions from the input into the silo and the maximum loadout rate through the airlocks. The emission factors are shown in the April 5, 2001, revision of the permit application.

#### 1.8 Blood Silo and Airlocks

The production rates and compliance with the limits are based on daily values.

The PM<sub>10</sub> emissions from the blood silo are controlled by a baghouse with 99% control efficiency for PM<sub>10</sub>. The annual throughput is limited by the process and by the permit to 12,045 tons per year. The April 5, 2001, permit revision shows an annual throughput of 12,090 tons per year, but the true value is 12,045 tons per year according to Rechelle Hollowaty of IBP in a January 8, 2002, phone call to Carole Zundel.

The PM<sub>10</sub> emissions from the blood silo airlocks are controlled by a different baghouse than the baghouse for the silo itself. The annual throughput for the airlock (for loadout) is the same as for the silo, but the daily limit is higher (103 tons per day) for the airlock than for the input into the silo (33 tons per day). The annual emission rate is shown in the April 5, 2001, revision, and the daily emission rate from the airlocks is shown in the December 24, 2001, addendum.

2. Modeling

The modeling technical memorandum is attached.

3. Area Classification

IBP Inc.-Kuna, Ad County, Idaho, is located in Ada County, Idaho, in AQCR 64. The area is classified as unclassifiable for all federal and state criteria air pollutants (i.e., PM<sub>10</sub>, NO<sub>x</sub>, VOCs, and SO<sub>x</sub>). The area is designated non-attainment for CO.

4. Facility Classification

The facility is not a designated facility as defined in IDAPA 58.01.01.006.25. The facility is classified as an SM source because the actual emissions of any criteria pollutant are less than 100 tons per year.

5. Regulatory Review

This OP is subject to the following permitting requirements:

- |    |                                     |                                                |
|----|-------------------------------------|------------------------------------------------|
| a. | <u>IDAPA 58.01.01.401</u>           | Tier II Operating Permit                       |
| b. | <u>IDAPA 58.01.01.403</u>           | Permit Requirements for Tier II Sources        |
| c. | <u>IDAPA 58.01.01.404.01(c)</u>     | Opportunity for Public Comment                 |
| d. | <u>IDAPA 58.01.01.404.04</u>        | Authority to Revise or Renew Operating Permits |
| e. | <u>IDAPA 58.01.01.406</u>           | Obligation to Comply                           |
| f. | <u>IDAPA 58.01.01.470</u>           | Permit Application Fees for Tier II Permits    |
| g. | <u>IDAPA 58.01.01.625</u>           | Visible Emission Limitation                    |
| h. | <u>IDAPA 58.01.01.650</u>           | General Rules for the Control of Fugitive Dust |
| i. | <u>IDAPA 58.01.01.775 &amp; 776</u> | Rules for Control of Odors                     |
| j. | <u>IDAPA 58.01.01.835 – 839</u>     | Rules for Control of Rendering Plants          |

6. AIRS

**AIRS/AFS FACILITY-WIDE CLASSIFICATION DATA ENTRY FORM**

AIR PROGRAM	SIP	PSD	NSPS	NESHAP	MACT	TITLE V	AREA CLASSIFICATION
POLLUTANT			(Part 60)	(Part 61)	(Part 63)		A - Attainment U - Unclassifiable N - Nonattainment
SO <sub>2</sub>	SM						U
NO <sub>x</sub>	B						U
CO	B						N
PM <sub>10</sub>	B						U
PM (Particulate)	B						
VOC	B						
THAP (Total HAPs)	B						
			APPLICABLE SUBPART				

**AIRS/AFS CLASSIFICATION CODES:**

- A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For NESHAP only, class "A" is applied to each pollutant which is below the 10 T/yr threshold, but which contributes to a plant total in excess of 25 T/yr of all NESHAP pollutants.
- SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.
- B = Actual and potential emissions below all applicable major source thresholds.
- C = Class is unknown.
- ND = Major source thresholds are not defined (e.g., radionuclides).

**FEES**

Fees apply to this facility in accordance with IDAPA 58.01.01.470.

**RECOMMENDATIONS**

Based on the review of the application materials, and all applicable state and federal regulations, staff recommends that DEQ issue a modified Tier II OP to IBP Inc. An opportunity for public comment on the air quality aspects of the proposed OP has been provided in accordance with IDAPA 58.01.01.404.01.c.

CJZ/sm:tk


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cc: Joan Lechtenbert, Air Quality Division  
Sherry Davis, Technical Services  
Matt Stoll, Boise Regional Office

# APPENDIX

## MEMORANDUM

TO: Carole Zundel, Air Quality Engineer, State Office of Technical Services

FROM: Kevin Schilling, Air Quality Scientist, State Office of Technical Services 

SUBJECT: Modeling Review for the Tier II Operating Permit Renewal; Iowa Beef Processors (IBP) in Kuna, Idaho

DATE: January 10, 2002

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### 1. SUMMARY:

Trinity Consultants Inc., on behalf of IBP (Trinity/IBP), submitted a Tier II operating permit renewal for the facility in Kuna, Idaho. The purpose of the Tier II is to limit the number of operational hours such that emissions are below major source thresholds. The Tier II application addresses all pollutants on a facility-wide basis. The criteria pollutants of concern for this facility are particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM<sub>10</sub>), NO<sub>x</sub>, sulfur dioxide (SO<sub>2</sub>), and carbon monoxide (CO). There are no ambient air quality standards for toxic air pollutants (TAPs) for use in Tier II permitting actions. However, under IDAPA 58.01.01.161, the Department of Environmental Quality (DEQ) will ensure that any TAP "shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably effect human or animal life or vegetation." Procedures required to demonstrate compliance with IDAPA 58.01.01.161 have not been finalized. The current Tier II permitting process requires those emissions that exceed the screening emission level presented in IDAPA 58.01.01.585 and .586 be modeled. For this facility, the following TAPs exceeded the screening level: benzene, formaldehyde, arsenic, beryllium, cadmium, chromium, and nickel. The modeling analysis performed by DEQ for these TAP emissions resulted in ambient air concentrations that do not unreasonably affect human or animal life or vegetation, as determined by DEQ.

Review of the initial modeling submitted by Trinity/IBP on June 5, 2001 was conducted by Michael DuBois, Air Quality Analyst, State Office of Technical Services. Minor revisions to the modeling were made by a Trinity/IBP submittal dated December 14, 2001. This memo incorporates the review of Mr. DuBois and the effects of the December 14 revisions.

### 2. DISCUSSION:

#### 2.1 Applicable Air Quality Impact Limits

This facility is located in Ada County, which is designated an attainment or unclassifiable area for SO<sub>2</sub> and NO<sub>x</sub>, and nonattainment for CO. The classification for PM<sub>10</sub> is not determined. However, it has been determined by the Boise Regional Office that the area will be treated as unclassified for PM<sub>10</sub> for minor sources and minor modifications. If the ambient impacts from the proposed project exceed the significant contribution levels, then a full impact analysis is required. In a full impact analysis the total ambient impacts, including background, for each criteria pollutant must be below the National Ambient Air Quality Standards, listed in Table 1. In non-attainment areas the acceptable level of emissions and corresponding ambient impacts are evaluated during the development of the State Implementation Plan (SIP) for that area. Therefore, facility-wide modeling results for CO are evaluated against significant contribution concentrations as a screening level analysis. If impacts exceed the significant contribution concentration, then further analyses are conducted in accordance with provisions of the SIP.

The incremental ambient impacts for the TAPs are evaluated against the emission screening levels provided in IDAPA 58.01.01.585 and .586. TAPs with emissions exceeding the emission screening levels are then modeled to estimate the impacts to ambient air. The resulting estimated maximum concentrations are compared to the Acceptable Ambient Concentrations in IDAPA 58.01.01.585 for

non-carcinogens. For carcinogens, the unit risk factors presents in IDAPA 58.01.01.586 are used to estimate the cancer risk for each carcinogenic TAP emitted. The cancer risk of all TAPs are then summed and compared to a screening acceptable risk level of 1-in-100,000.

**Table 1. Applicable regulatory limits**

Pollutant	Averaging Period	Regulatory Limit <sup>a</sup> ( $\mu\text{g}/\text{m}^3$ ) <sup>b</sup>
Oxides of nitrogen	Annual	100
Sulfur dioxide	3-hour	1,300
	24-hour	375
	Annual	80
Carbon monoxide	1-hour	2,000 <sup>d</sup>
	8-hour	500 <sup>d</sup>
	24-hour	150
PM <sub>10</sub> <sup>c</sup>	24-hour	150
	Annual	50

<sup>a</sup> IDAPA 58.01.01.577

<sup>b</sup> Micrograms per cubic meter

<sup>c</sup> Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

<sup>d</sup> Significant Contribution level as per IDAPA 58.01.01.006.93

## 2.2 Background Concentrations

Background concentrations for this project were provided to Trinity from DEQ in January 2001 and are presented in Table 2. Background concentrations for Boise, Idaho, were used for PM<sub>10</sub>. Statewide background concentrations were used for all other criteria pollutants with the exception of CO. There are no background concentrations available for TAPs

**Table 2. Background concentrations**

Pollutant	Averaging Period	Background Concentration ( $\mu\text{g}/\text{m}^3$ ) <sup>a</sup>
Oxides of nitrogen	Annual	40
Sulfur dioxide	3-hour	374
	24-hour	120
	Annual	18.3
Carbon monoxide	1-hour	NA (non-attainment area)
	8-hour	NA (non-attainment area)
	24-hour	123
PM <sub>10</sub> <sup>b</sup>	24-hour	123
	Annual	34.6

<sup>a</sup> Micrograms per cubic meter

<sup>b</sup> Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

## 2.3 Modeling Impact Assessment

On June 5, 2001, Trinity/IBP submitted a Tier II renewal for the IBP facility in Kuna, Idaho. The pollutants of concern for this facility are PM<sub>10</sub>, NO<sub>x</sub>, and SO<sub>2</sub>. CO concentrations were found to be below both the 8 hour and 24 hour significance levels. Trinity/IBP used the most recent version of the U.S. Environmental Protection Agency approved ISC-Prime model. ISC3-PRIME was used because there are numerous buildings of various heights in close proximity to the stacks, and the ISC3 model does not incorporate building downwash effects as accurately as ISC3-PRIME. All regulatory defaults were used along with the rural dispersion coefficients, building downwash impacts, and five years of Boise Airport surface and upper air meteorological data (years 1987 through 1991). A rural land-use option is used because it best represents land usage around the facility.



Two square Cartesian receptor grids, a fine grid and a coarse grid, and a boundary grid were used for the ambient air impact analysis. The fine grid extends approximately 1 kilometer from the plant boundary on all sides and contains receptors with a 100 meter spacing. The coarse grid begins 1 kilometer from the plant boundary and extends to 10 kilometers with a receptor spacing of 1000 meters. The boundary grid consists of receptors with a 50 meter spacing along the fence line of the facility.

On December 14, 2001, Trinity/IBP submitted "Ambient Air Dispersion Modeling Addendum #2" for the IBP facility. This addendum included remodeling of the short-term PM10 emissions based on new information on short-term maximum process rates for the silos and airlocks. Emissions from the blood hammermill cyclone were removed because the blood hammermill is a "completely closed system."

Table 3 lists the source parameters used by Trinity in the analysis. The emission rates used in the ambient air assessment are presented in Table 4.

**Table 3. Source Parameters**

Source	Stack Height ft <sup>a</sup>	Stack Diameter ft	Exhaust Velocity ft/sec <sup>c</sup>	Stack Temp. °F <sup>d</sup>
Electric Gen. 2	30.0	0.167	0.003	500
Electric Gen. 1	30.0	0.167	0.003	500
Fire Pump Gen.	30.0	0.333	0.003	500
East Boiler	39.5	2.5	32.154	475
West Boiler	39.5	2.5	32.154	475
Rendering Scrubber	50.0	4.0	79.577	62
Blood Baghouse	18.0	0.667	23.873	59
Meat Scraps Baghouse	18.0	0.667	23.873	59
Pasteurization Acid Cabinet	48.25	2.0	79.577	95
Hide Up Puller	36.67	0.940	7.2	59

<sup>a</sup> feet

<sup>b</sup> feet

<sup>c</sup> feet per second

<sup>d</sup> degrees Fahrenheit

**Table 4. Pollutant Emission Rates**

Source	Maximum Hourly Emission Rate <sup>a</sup>				Annual Emission Rate <sup>b</sup>			
	PM <sub>10</sub> <sup>c</sup>	SO <sub>2</sub> <sup>c</sup>	NOx <sup>c</sup>	CO <sup>c</sup>	PM <sub>10</sub>	SO <sub>2</sub>	NOx	CO
Electric Gen. 2	0.646	0.602	9.097	1.960	0.033	0.031	0.467	0.101
Electric Gen. 1	0.581	0.541	8.188	1.764	0.037	0.034	0.519	0.112
Fire Pump Gen.	1.291	1.203	18.195	3.921	0.074	0.069	1.039	0.224
East Boiler	2.602	55.978	15.768	9.090	2.289	46.161	14.900	9.090
West Boiler	2.602	55.978	15.768	9.090	2.289	46.161	14.900	9.090
Rendering Scrubber	1.888	0.113	1.170	0.991	1.929 <sup>d</sup>	0.113	1.170	0.991
Blood Baghouse	0.006	-	-	-	0.002	-	-	-
Meat Scraps Baghouse	0.036	-	-	-	0.021	-	-	-
Hide Up Puller	0.531	-	-	-	0.170	-	-	-
Pasteurization Acid Cabinet	1.183	-	-	-	1.183	-	-	-

a. emission rate used for 24-hour or shorter averaging periods

b. emission rate used for annual averaging period

c. pounds per hour

d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

- e. sulfur dioxide
- f. oxides of nitrogen
- g. carbon monoxide
- h. Annual modeling using the revised emission rate of 1.888 ton/yr was not conducted because compliance with NAAQS was easily demonstrated with modeling results obtained from the 1.929 ton/yr emission rate.

### 3. MODELING RESULTS:

The ambient air impacts for criteria pollutants and the comparison to the NAAQS are listed in Table 5. The ambient impacts for the relevant TAPs are listed in Table 6. The ambient impacts for the TAPs are all below the acceptable ambient concentrations listed in IDAPA 58.01.01.586 with the exception of arsenic. Although TAP Tier II permitting requirements for demonstrating compliance with IDAPA 58.01.01.161 have not been finalized, DEQ currently considers a risk increment of one in a hundred thousand to be a protective standard for facility-wide Tier II permitting and IDAPA 58.01.01.161. Since the acceptable ambient concentrations listed in IDAPA 58.01.01.586 are based on an excess risk of one in a million, a cumulative risk for the modeled TAP ambient concentrations was estimated. The cumulative risk estimate for the modeled TAP concentrations is between one in a hundred thousand and one in a million and therefore does not require further analysis at this time.

**Table 5. Criteria pollutant ambient impacts for the entire facility.**

Pollutant	Averaging Period	Ambient concentration ( $\mu\text{g}/\text{m}^3$ ) <sup>a</sup>	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Total Ambient Concentration ( $\mu\text{g}/\text{m}^3$ )	Regulatory Limit <sup>b</sup> ( $\mu\text{g}/\text{m}^3$ )	Compliant (Y or N)
Oxides of nitrogen	Annual	19.0	40.0	59.0	100	Y
Sulfur dioxide	3-hour	558.14	374.7	932.84	1,300	Y
	24-hour	221.80	120.5	342.3	375	Y
	Annual	50.18	18.3	68.48	80	Y
Carbon monoxide	1-hour	337.15	NA <sup>d</sup>	NA <sup>d</sup>	2,000 <sup>e</sup>	Y
	8-hour	97.08	NA <sup>d</sup>	NA <sup>d</sup>	500 <sup>e</sup>	Y
PM <sub>10</sub> <sup>c</sup>	24-hour	21.92	123.0	144.79	150	Y
	Annual	3.59	34.6	38.19	50	Y

<sup>a</sup> Micrograms per cubic meter

<sup>b</sup> IDAPA 58.01.01.577

<sup>c</sup> Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

<sup>d</sup> The area is classified as non-attainment for carbon monoxide. Therefore, the ambient concentration resulting from the project is compared to significant contribution levels and background concentrations are not used in the analysis.

<sup>e</sup> Significant Contribution level as per IDAPA 58.01.01.006.93.

**Table 6. TAP ambient impacts for the entire facility**

Pollutant	Averaging Period	Ambient Concentration ( $\mu\text{g}/\text{m}^3$ ) <sup>a</sup>	Unit Risk Factor (URF) <sup>b</sup>	Estimated Risk
Arsenic	Annual	4.80 E-04	4.30 E-03	2.06 E-06
Beryllium	Annual	3.60 E-04	2.40 E-04	8.64 E-08
Cadmium	Annual	3.60 E-04	1.80 E-03	6.48 E-07
Chromium	Annual	2.75 E-04	1.20 E-02	3.30 E-06
Formaldehyde	Annual	2.83E-02	1.3 0E-05	3.68 E-07
Nickel	Annual	3.60 E-04	2.40 E-04	8.64 E-08
Cumulative Risk				6.55 E-06

<sup>a</sup> Micrograms per cubic meter

<sup>b</sup> Unit Risk Factor – The upper bound lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1  $\mu\text{g}/\text{m}^3$

Electronic copies of the modeling analysis are saved on disk. Carole Zundel has reviewed this modeling memo to ensure consistency with the permit and technical memorandum.

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